

# 2018 Virginia FFA Milk Quality and Products Career Development Event

## Problem Solving

Name: \_\_\_\_\_ FFA Chapter: \_\_\_\_\_

General instructions: *This exercise consists of 20 multiple-choice questions. Each question is worth 5 points. Mark your answer in the "Problem Solving" section on your Scantron sheet. Time limit is 40 minutes.*

**Table 1: Per capita consumption of dairy products in the United States (Source: ERS, USDA)**

Year	Fluid Milk	Butter	Natural Cheese	Cottage Cheese	Evaporated and Condensed Milk	Ice Cream	Reduced Fat Ice Cream	Nonfat Dry Milk	All Products*
--- Pounds ---									
1975	247	4.7	14.2	4.6	8.7	18.2	6.5	3.3	539
1980	234	4.5	17.5	4.4	7.0	17.1	6.1	3.0	543
1985	227	4.9	22.6	4.0	7.5	17.7	5.9	2.3	594
1990	220	4.3	24.6	3.3	7.9	15.4	6.6	2.9	568
1995	205	4.6	26.7	2.7	6.5	15.0	7.0	3.4	571
2000	197	4.5	29.6	2.6	5.8	16.1	6.6	2.7	591
2005	186	4.5	31.4	2.7	6.1	15.1	6.0	4.2	604
2010	178	4.9	32.7	2.3	7.2	14.0	6.5	3.2	604
2015	156	5.6	35.1	2.1	7.7	12.9	6.5	3.3	630

*\*Milk equivalent, milk fat basis*

Use Table 1 to answer questions 1-3.

1. What category of dairy products shows a constant increase in per capita consumption from 1975 to 2015?
  - A. Butter
  - B. Cottage cheese
  - C. Fluid milk
  - D. Natural cheese
  
2. What happened to the amount of dairy products consumed per person from 1975 to 2015?
  - A. It decreased by 14.4 percent
  - B. It decreased by 16.9 percent
  - C. It increased by 14.4 percent
  - D. It increased by 16.9 percent
  
3. Which category of dairy products has the largest percentage decrease in per capita consumption from 2000 to 2015?
  - A. Cottage cheese
  - B. Fluid milk
  - C. Ice cream
  - D. Natural cheese

## 2018 Virginia FFA Milk Quality and Products Career Development Event Problem Solving

**Table 2: Top Ten Dairy States in 2017**

Rank based on 2017	Total Milk Production (billion pounds)			Total Cows (thousand head)			Production per Cow (pounds)		
	State	2007	2017	State	2007	2017	State	2007	2017
1	CA	40,683	39,798	CA	1,813	1,749	MI	22,681	26,302
2	WI	24,080	30,320	WI	1,247	1,278	CO	22,915	26,181
3	NY	12,103	14,912	NY	627	623	NM	21,363	24,960
4	ID	11,549	14,627	ID	513	600	AZ	23,260	24,680
5	TX	7,379	12,054	PA	550	525	ID	22,513	24,378
6	MI	7,598	11,231	TX	349	511	NE	18,220	24,067
7	PA	10,682	10,938	MN	460	458	NY	19,303	23,936
8	MN	8,656	9,864	MI	335	427	WA	23,239	23,818
9	NM	7,306	8,212	NM	342	329	IA	20,085	23,725
10	WA	5,531	6,526	WA	238	274	WI	19,310	23,725

Use Table 2 to answer questions 4-6.

4. Total milk production in the U.S. in 2017 was 215.5 billion pounds. What percent of total production did the top 5 dairy states account for?
  - A. 44.5%
  - B. 51.8%
  - C. 62.9%
  - D. 73.5%
5. How many of the top ten states for total cows showed an increase in cow numbers from 2007 to 2017?
  - A. 1
  - B. 4
  - C. 5
  - D. 9
6. Which state had the smallest percentage increase in production per cow from 2007 to 2017?
  - A. Arizona
  - B. Michigan
  - C. Nebraska
  - D. Washington
7. A manufacturer wants to produce 500 pounds of ice cream mix containing 12% fat. How many pounds of cream containing 40% fat will be needed to supply the fat required?
  - A. 60
  - B. 150
  - C. 200
  - D. 240
8. A gallon of milk costs \$2.99 per gallon in the grocery store. How much would the milk cost on a hundredweight basis?
  - A. \$25.71
  - B. \$29.90
  - C. \$34.77
  - D. \$64.29
9. The average Jersey cow on DHIA in Virginia produces 50 pounds of milk per day. Approximately how many pints do these cows produce each day?
  - A. 23.3
  - B. 40.0
  - C. 46.5
  - D. 93.0

## 2018 Virginia FFA Milk Quality and Products Career Development Event Problem Solving

10. Dairy farmers pay \$0.15 per hundredweight of milk sold for dairy promotion and research. How much would a farmer pay this year if his 500 cow produced an average of 24,000 pounds per cow?
- \$720
  - \$18,000
  - \$36,000
  - \$1,800,000

*A dairy farmer's milk is sold in a federal order and the farmer is based upon all the components in his milk. Answer questions 11-14 based upon the following information.*

Monthly milk production: 1,000,000 pounds, 3.9%fat, 3.2% protein, 5.9% other solids

Market information

Butterfat price = \$2.63/lb

Protein price = \$1.86/lb

Other solids price = \$0.07/lb

SCC premium = \$0.30/cwt (SCC must be below 200,000 cells/ml.)

11. How much would the farmer be paid for butterfat for this month?
- \$10,257
  - \$102,570
  - \$674,359
  - \$2,630,000
12. How much would the farmer be paid for protein for this month?
- \$5,952
  - \$59,520
  - \$72,540
  - \$84,160
13. How much would the farmer be paid for other solids for this month?
- \$413
  - \$2,240
  - \$4,130
  - \$109,740

14. How much would the farmer receive for the SCC premium this month if the average SCC was 250,000 cells/ml?
- \$0
  - \$3,000
  - \$30,000
  - \$300,000
15. Which of the following is most expensive per gallon?

Item	Unit	Price
Chocolate milk, 1%	Pint	\$1.19
Reduced fat milk	Half gallon	\$2.49
Skim milk	Quart	\$2.19
Whole milk	Half gallon	\$2.59

- Chocolate milk, 1% - pint
  - Reduced fat milk - half gallon
  - Skim milk - quart
  - Whole milk - half gallon
16. A dairy producer plans to start a cheddar cheese business. He estimates that he can sell 3,500 pounds of cheese per week. How many pounds of the farm's milk will he need to dedicate to cheese production on a daily basis on average?
- 2,000
  - 5,000
  - 6,000
  - 10,600

## 2018 Virginia FFA Milk Quality and Products Career Development Event Problem Solving

**Table 3: Cow Data**

Cow	Milk/day (lb)	Fat (%)	Protein (%)	SCC (cells/ml)
1	115	2.9	3.2	800,000
2	106	4.7	3.4	76,000
3	59	3.4	3.1	1,970,000
4	80	4.1	2.7	230,000

Use Table 3 to answer questions 17-19.

17. How many total pounds of fat to the nearest tenth were produced per day by the four cows?
- 11.3
  - 13.6
  - 15.1
  - 33.3
18. Which cow produced the most pounds of protein per day?
- 1
  - 2
  - 3
  - 4
19. What is the weighted average somatic cell count for the four cows?
- 651,906
  - 769,000
  - 2,136,000
  - 58,671,500
20. Basic Biscuit Recipe Ingredients
- 2 cups all-purpose flour
  - 1 tablespoon baking powder
  - 1/2 teaspoon salt
  - 1/2 cup butter, softened
  - 3/4 cup milk
- How many pounds of whole milk are needed to make the dairy products in this recipe for basic biscuits?  
(Hint: A cup of butter weighs 1/2 pound.)
- 0.4 pounds
  - 5.7 pounds
  - 6.5 pounds
  - 11.0 pounds

# 2018 Virginia FFA Milk Quality and Products Career Development Event KEY

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 C. 6,000  
 D. 10,600
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  - C. 2,136,000
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(Hint: A cup of butter weighs 1/2 pound.)

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- B. 5.7 pounds**
- C. 6.5 pounds
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